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## The Effect of Lineup Size on Eyewitness Accuracy

Alyssa Baumann  
*Augsburg College*

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ALYSSA BAUMANN  
AUGSBURG COLLEGE

THE EFFECT OF LINEUP SIZE ON  
EYEWITNESS ACCURACY

## ABSTRACT

The research investigated the impact of the number of members in a police lineup on eyewitness identification. Participants attempted to identify the perpetrator from either a sequential or simultaneous lineup. The number of members in the lineup differed between 6 members and 12 members, simultaneous or sequential lineup presentation, and target-present or target-absent.

In the target-present condition, the research was concerned with correct identifications. Thus, the 6 member simultaneous lineup should yield the most correct identifications. The 12 member simultaneous lineup should yield the second highest. The 6 and 12 member sequential lineup presentation should yield fewer correct identifications because sequential lineups have lower choosing rates. In terms of errors, or false positives, the 12 member simultaneous lineup should yield the largest number of false positives because there are more members from which to choose. The 6 person simultaneous lineup will provide the second highest number of false positives; the 12 member sequential lineup will yield the third. The 6 member sequential lineup should produce the fewest false positives with low choosing rates and less pressure to choose.

The hypotheses were all supported. The data collected supported a 6-person lineup over a 12-person lineup. The 6-person simultaneous lineup yielded the most correct identifications. The 6-person sequential lineup yielded the least amount of false positives. The small sample size prompts additional research to see if trends continue and stabilize.

## INTRODUCTION

The eyewitness has long been the critical factor in determining the description and identity of the suspect in a crime. Often eyewitnesses present the only evidence to implicate a suspect. Thus, great weight is placed on the eyewitness' ability to incriminate an individual. However, research has noted that mistaken identification rates are surprisingly high among eyewitnesses (Wells & Olson, 2003). This risk is clearly demonstrated in the recent development of DNA testing, resulting in the exoneration of 216 individuals in the United States to date, April 23, 2008. A large percentage, approximately 75%, of these initial convictions was based on mistaken eyewitness identification (Scheck & Neufeld, 2008).

The first stages of eyewitness identification begin with description and investigation. If a suspect is located, the eyewitness is asked to identify the offender from a lineup containing other individuals who match the description of the perpetrator provided by the witness. The recent DNA exonerations have provided verification that errors from lineup identifications are all too common. Now police lineup construction and procedures are being scrutinized not only to reduce the risk of false identification, but also to increase or maintain the accuracy that can be exhibited in lineups. This recent wave of research is being conducted in cognitive and social psychological realms.

The two goals of lineups are to provide the witness a reasonable chance to identify an offender and thus generate evidence for conviction, and to minimize the risk of false identification for an innocent suspect. A lineup is considered fair to the suspect when the lineup contains a sufficient number of distracters who are similar in appearance to the general description of the perpetrator (Brigham, Meissner, & Wasserman, 1999).

Various numbers of distracters can be placed in lineups. The research questions at hand then become: What number is sufficient? What number is most effective?

## RECENT DEVELOPMENTS

Eyewitness research in recent years has uncovered new information, much of which is addressed in a literature review by Wells & Olson (2003). Two types of factors, estimator variables and system variables, have been found to have a major influence on eyewitness accuracy. *Estimator variables* are not under the control of the criminal justice system; the impact of these variables can only be estimated after the fact. Wells and Olson (2003) name four estimator variable categories: "(1) characteristics of the witnesses, (2) characteristics of the event, (3) characteristics of the testimony, and (4) the abilities of the testimony evaluators to discriminate between accurate and inaccurate witness testimony" (Wells & Olson, 2003: 280). Characteristics of the witness, such as age, gender, and race, have been studied and shown to have significant effects on eyewitness accuracy. The characteristics of the event itself, including the amount of time the suspect is viewed, lighting conditions, any disguise of the suspect, the distinctiveness of the suspect, the presence or absence of a weapon, and the duration of a crime have all been linked to eyewitness accuracy. Characteristics of eyewitness testimony, such as witness confidence and accuracy, have been researched and the studies yield important results: witness certainty is minimally related to accuracy; confidence does not postdict correct identifications; administrator feedback influences eyewitness confidence; and decision time and confidence are negatively correlated. Finally, observers such as judges and jurors have been shown to have little ability to determine correct discriminations between accurate and inaccurate witness testimony (Wells & Olson, 2003).

*System variables* also have an effect on eyewitness accuracy. These variables are different from estimator variables in that the criminal justice system has the potential to control system variable effects; examples include instructions given to the witness before viewing a lineup and lineup size. System variables prevent inaccurate eyewitness identifications from being made in the first place, even before the trial. Wells & Olson's (2003) review delves into the various aspects of a lineup that could potentially and ideally allow control over system variables.

An underlying issue for lineup procedure is the human tendency to make relative judgments. Wells and Olson (2003) define the phenomenon as the tendency of an eyewitness "to select a person from a lineup who most resembles the eyewitness's memory of the culprit relative to the other lineup member" (2003: 286). When relative judgment is exercised, an innocent suspect who resembles the culprit may be chosen. Since the innocent suspect has likely been arrested due to his physical similarity to the offender, a marked risk arises from relative judgment in this situation. To reduce the risk to an innocent suspect, all members of the lineup must resemble the description given by the witness, thereby distributing the chance identification (guessing) across a field of similar individuals who are known innocents (Wells & Olson, 2003).

Given the importance of fair lineup construction, techniques have been established to assess filler or foil effectiveness. Two aspects of assessed lineup fairness are termed *functional size* and *effective size*. *Functional size* refers to the number of lineup members who fit the eyewitness's description of the perpetrator and are thereby



viable distracters for the witness with a poor memory (Wells & Olson, 2003). For example, if the offender description is of an African American male in his early teens, but the lineup includes the suspect and five white, middle – aged men, the functional size is 1.0, even though there are six members. The number of viable lineup members that match the description is 1. When the functional size and the nominal size are equal in a lineup, it is considered fair (Tredoux, 1999).

*Effective size* is a supplemental technique and is used to calculate the expected identifications of the suspect. A bias is determined to be present if the observed and the expected proportion of identifications of the suspect differ significantly (Brigham, Ready, & Spier, 1990). A mock witness paradigm can be used to illustrate this concept. Ideally a lineup should not be biased against the suspect; all lineup members should be plausible suspects matching the description given to law enforcement. The evaluation is conducted by having mock witnesses—individuals with no knowledge of the crime who only have the verbal description of the suspect—choose who best fits the description. The lineup is biased if the suspect is selected by a disproportionate number of mock witnesses. Thus the mock witness is a control to determine lineup bias; if the lineup is unbiased, all of the lineup members match the witness's description equally, and mock witnesses' guesses should be distributed evenly across the lineup.

Lineup presentation methods have also been developed in an effort to reduce risk and maintain accuracy of eyewitness identification. The best known alternative to the traditional simultaneous lineup is the sequential lineup (Wells & Olson, 2003). The simultaneous lineup encourages relative judgment since it presents the witness with the ability to compare lineup members. Sequential lineups encourage absolute judgment (Wells & Olson, 2003), use of the witness's memory of the suspect to determine, in a one-at-a-time fashion, whether or not the suspect is in the lineup. The witness no longer can compare the members of the lineup at the same time and choose the individual who looks most like the perpetrator; now he or she must rely on memory using the absolute criterion. As Wells, Malpass, Lindsay, Fisher, Turtle, & Fulero (2000) suggest, a criterion of "Is this the perpetrator or not?" compared to the relative judgment of "Is this person more similar to the perpetrator than the other lineup members?" is a more desirable alternative to relative judgment. Absolute judgment is the ideal judgment in that the eyewitness identifies the suspect from memory without relative comparison. Sequential lineups seem to be the most effective lineup presentation method at the present time to discourage relative judgment and rely on absolute judgment (Wells & Olson, 2003).

Pivotal research conducted in 2001 by Steblay, Dysart, Fulero, and Lindsay thoroughly examined, through the technique of meta-analysis, the accuracy rate of a traditional simultaneous lineup presentation and the alternative presentation, the sequential lineup, devised by Lindsay and Wells (1985). The results of this study demonstrated that simultaneous lineups produced more correct identifications than sequential lineups when the target was present in the lineup. Yet, once moderator variables or controlling factors are introduced, the difference between the presentation styles decreases. The important finding in the meta-analysis showed that correct rejections in target-absent sequential lineups were significantly higher than in simultaneous lineups. Thus the study demonstrated that although the choosing rates are lower for sequential lineups, there are more correct rejections of lineups not containing

the suspect, consequently protecting the innocent (Stebly, et al., 2001).

Lineup presentation methods come under the heading of system variables, since they are able to be controlled by the criminal justice system. Filler selections, lineup biases, and the lineup presentation format are examples of system variables. Nominal lineup size refers to the number of individuals in the lineup; lineup size is another system variable and can be manipulated by the criminal justice system.

#### RATIONALE FOR SUSPECTED INFLUENCE OF LINEUP SIZE

Lineup size has been a little-investigated aspect of lineups. The traditional 6 person lineup is not the international standard. Lineups containing 9 or 10 individuals are used in England while up to 12 lineup members are used in Canada (Levi & Lindsay, 2001). An increase in lineup size should reduce the statistical risk of false identification since the likelihood that an innocent member of the lineup would be identified decreases as the nominal size increases. The probability can be laid out as follows: the probability of a specific person being chosen from a 6 person lineup is 1 in 6, or 16.67% whereas the probability of one person being chosen from a 12 person lineup is 1 in 12, or 8.33% (Beaudry, Lindsay, Boyce, Leach, Bertrand, & Mansour, 2005). Wells, Small, Penrod, Malpass, Fulero, & Brimacombe (1998) agree and state that the "probability of false identification is inversely related to the number of lineup members and that there is a diminishing return on this probability with the addition of each lineup member" (p. 27). They state that the chance that the innocent suspect would stand out by mere chance is 1/6 in a 6 person lineup and 1/12 in a 12 person lineup. When viewed through statistics, the larger lineup should provide each member of the lineup a lesser chance of being chosen by chance.

There is a concern, however, that a larger lineup, specifically in a sequential presentation form, could have negative effects on eyewitness identification accuracy. Since the witness may view a larger number of potential suspects before actually seeing the target, there may be some interference in their recognition. Beaudry, et al. (2005) found support for this concern in their research, showing a significant decrease in the correct identification rates when the target was placed later in the sequential lineup. More specifically, they found that targets in the 6<sup>th</sup> position had a higher correct identification rate as compared to targets placed in the 10<sup>th</sup> position.

Underlying both of these effects is the assumption that choosing rates, the percentage of witnesses who actually chose a member from the lineup, are unaffected. If choosing rates remain the same, then the research might expect benefits to a simultaneous 12 person lineup and hindrances to a 12 person sequential lineup. The question lies in the changing of choosing rates and the ramifications of changing choosing rates on accuracy.

#### RESEARCH ON NOMINAL LINEUP SIZE

Some research has been conducted in the area of nominal lineup size, but there is currently no agreement among scholars. The studies can be broken down into those done with a simultaneous lineup presentation and those using a sequential lineup presentation method.

##### *Simultaneous Studies*

Since the impetus for lineup research is the protection of innocent individuals,

relative judgment is becoming a more recognized phenomenon. Relative judgment prompts the choosing of the lineup member who most closely resembles the perpetrator. If the chosen individual is innocent, an obvious problem arises. Thus by increasing the size of the lineup in simultaneous lineup presentations, a greater protection for the innocent should be created. Initially there was little support to the theory that nominal lineup size affected witness identification accuracy. Nosworthy & Lindsay (1999) investigated simultaneous lineups in two studies and found that the presence of additional foils, in lineups of 4, 8, 12, 16, and 20 target-absent and target-present lineups, did not offer increased protection to the innocent lineup members. The addition of good quality foils added little discriminatory power for the witness. Lineup nominal size had no significant effect on accuracy. Finding no difference, the authors speculated that a small lineup is no more suggestive than a large lineup as long as at least three good quality foils are present. Their conclusion is that the quality - not quantity - of foils is the critical issue. The frequency of choices, spread across a larger number of lineup members, increased with the nominal size. Thus, selections may increase with nominal size but the rate of false identifications of a specific lineup member would not be expected to increase.

Levi and Lindsay (2001) agreed with Nosworthy and Lindsay (1990) in that there should not be a decline in correct identifications from a simultaneous lineup as the lineup size increases. Levi and Lindsay (2001) further state that increasing the nominal size of lineups should reduce the likelihood of false identifications, but have little or no influence on correct identifications. Thus they concluded that false positives can be minimized with an increase in nominal lineup size.

Cutler, Penrod, and Martens (1987) examined various factors in eyewitness accuracy including lineup nominal size and suspect disguise (a change in appearance of the suspect). There was no main effect of lineup size. In the 6 member lineup, suspect disguise yielded little difference, but in the 12 member lineup, there was a significant effect of suspect disguise to influence incorrect choices. The effect of disguise on identification accuracy was stronger in the 12 member lineup than in the 6 member lineup in that 12 member lineups yielded more mistaken identifications when there was a suspect disguise than the mistaken identifications in 6 member lineups. This suggests that as nominal lineup size in a simultaneous lineup increases, a witness may become more susceptible to other factors.

The studies involving simultaneous lineups and lineup size lead to several tentative conclusions. Theoretically, false positives can be minimized with an increase in lineup size and should not cause a decline in correct identifications. The choosing rates appeared to increase with nominal size as well. However, the larger lineup size seemed to make witnesses more susceptible to other factors, such as suspect disguise.

#### *Sequential Studies*

Since the sequential lineup presentation method has been shown to reduce relative judgment, a larger lineup size may reinforce absolute reasoning in that the picture of the suspect may lie in the unseen photos (Lindsay, Nosworthy, Martin, & Martynuck, 1994). In fact, one procedural rule of the sequential lineup is to "backload." Although only six photographs are shown, the witness believes that many more are in the pile. For example, a stack of papers will actually only contain 6 photos for the eyewitness

to view; the stack itself appears to present more than 6. This provides backload for the eyewitness. They will not know how many photos they will be viewing. Sequential lineups have been shown to result in more conservative responding (Meissner, Tredoux, Parker, & MacLin, 2005).

Three studies have examined sequential lineup size, but they do not create a definitive assessment. Cutler, Penrod, O'Rourke, and Martens (1986) hypothesized that smaller lineups, rather than larger, would lead to more accurate identifications. However, they had little rationale to support their hypothesis. In comparing 6 and 12 person sequential lineups, they found no significant difference for correct identification performance in one experiment, but found a difference in their second experiment, with better eyewitness accuracy in smaller lineups. However, the study focused more on contextual cues rather than solely on nominal lineup size.

Leaving behind contextual cues, Lindsay, Nosworthy, Martin, & Martynuck (1994) sequentially presented mug shots to participants and asked them to identify the offender, while the nominal size of the mug shot series was manipulated. The study found that the witnesses tended to doubt their ability to recognize the criminal as the number of pictures they examined increased, but witnesses tended to underestimate their accuracy capabilities. This experiment did not, however, present a target-absent condition in their experiment; the suspect was always present in the mug shot sequence. Additionally, the sequential presentation of mug shots was viewed multiple times. Lindsay, et al., do not suggest using a sequential mug shot presentation process since many innocent individuals were identified as well. Their method, they claim, could be used to narrow suspects down, but should not be used as evidence, because there is no way to claim guilt beyond a reasonable doubt.

Meissner, Tredoux, Parker, & MacLin (2005) used more ideal conditions for lineup studies, however they did not concentrate on suspect identification. They examined lineup presentation (simultaneous and sequential) and nominal lineup size in numbers of 2, 4, 6, 8, 10, and 12, with both target-absent and target-present lineups. Results showed that increasing lineup size caused some reduction in the accuracy of the choices and also led to more conservative responding in both simultaneous lineups and sequential lineups. There was no presentation method and nominal size interaction. However, this was not directly applicable to the realm of eyewitnesses. The method for identification was having the participants view a photograph of an individual and then having them identify him or her in a lineup; it was a face recognition task.

In a newer study, the researchers actually concentrated on lineup size, but, once again, other effects were examined at the same time. Beaudry, et al. (2005) conducted research involving the multiple-choice, sequential, large (40 members) lineup, but they also compared it to real world 6 person lineups. Not only did they find that correct identification rates decreased the later the target was placed in the sequential presentation, but they found that larger lineups produced lower rates of correct identifications compared to 6 person lineups. There was a significant increase in false positives in larger lineups as well.

## PRESENT IMPLICATIONS

As the review of studies suggest, few studies have focused on the effects of

lineup presentation method and nominal lineup size. Studies have been done, but often with conflicting results or while examining various ancillary factors. No studies have been conducted using both presentation methods and directly examining the effect of nominal lineup size. To summarize the study results at this point, it appears there is minimal effect of nominal lineup size beyond 6 persons in simultaneous lineups with some potential to reduce risk. However, a larger nominal lineup size will yield more choosing from the lineup in a simultaneous presentation since the participant will have more choices with which to relatively judge their memory of the suspect. In the longer sequential lineups there appears to be reduction in false positives coming at the expense of correct identifications since the choosing rates drop. However, the conclusions are often contradictory and the discordance does not allow a solid conclusion to be drawn from past studies.

The goal of this study is to determine whether nominal lineup size has any effect in simultaneous and sequential lineup presentation. The distribution-of-errors notion suggests that the 12 person lineup will reduce the risk to any one member of the lineup, with the suspect's chance of selection at 1 in 12, whereas the 6 person lineup yields a 1 in 6 chance. However, the research also must consider whether choosing rates are affected differently by lineup size.

The current study will examine both a simultaneous and sequential lineup presentation and, using both target-present and target-absent conditions, look for a significant effect of nominal lineup size in a 6 member lineup and a 12 member lineup. The lineup member will be positioned among the first six members in all target-present lineups in order to combat position and interference effects.

To lay out this study's research hypotheses, the research will first divide the conditions into target-present and target-absent. In the target-present condition, the research is concerned with correct identifications of the suspect. Past research has indicated that simultaneous lineups promote high choosing rates, and when the target is present, simultaneous lineups can bring forth high levels of correct identifications. Therefore, the 6 member simultaneous lineup should yield the most correct identifications. The 12 member simultaneous lineup should yield the second highest garnering of correct identifications, seen in a slight reduction from the first. Additional members in the lineup may capture "lucky guesses," or chance identifications, of witnesses with weak memories that otherwise would have landed on the perpetrator in a 6 person lineup. In short, relative judgment favors a shorter lineup when the perpetrator is present.

The 6 and 12 member sequential lineup presentation will yield fewer correct identifications since sequential lineups do have lower choosing rates, resulting in fewer correct identifications when compared with simultaneous lineups. Since the participant will not know how many photos he or she will be viewing (sequential lineups are backloaded), and the perpetrator will be positioned among the first six, the results should be approximately the same in 6 and 12 person lineups. However, in sequential lineups, eyewitnesses may "switch" from an early selection to a later selection in the 12 person lineup. This may reduce target-present correct identification slightly in the 12 person lineup.

In the target-absent conditions, the hierarchy found in target-present is altered.



In target-absent conditions, the research will concentrate on the number of errors made through false positives, or choices. The 12 member simultaneous lineup should yield the largest number of errors since there are more members to choose from and relative judgment is in play. The 6 person simultaneous lineup will provide the second highest number of errors. There are fewer members to compare using relative judgment, but the choosing rate and the false positive rate will still be high.

Finally, the 12 member sequential lineup will yield the third highest number of errors. Due to the increased number of members, there may be pressure to choose among the later portion of the presentation. The 6 member sequential lineup should produce the fewest errors with low choosing rates and less pressure to choose.

Overall, the research anticipates that in either simultaneous or sequential formats, 6 person lineups will be significantly superior to 12 person lineups.

Table 1

*Ranking of the Highest Number of Correct Identifications in Target-Present Lineups*

Ranking	Lineup Condition
First	Simultaneous 6 Person
Second	Simultaneous 12 Person
Third	Sequential 6 Person
Fourth	Sequential 12 Person

Table 2

*Ranking of Highest Number of Errors, or Incorrect Identifications in Target-Absent Lineups*

Ranking	Lineup Condition
First	Simultaneous 12 Person
Second	Simultaneous 6 Person
Third	Sequential 12 Person
Fourth	Sequential 6 Person

#### Method

##### *Participants*

Participants were undergraduates enrolled in introductory psychology courses. They voluntarily signed up for the study to gain class credit or receive ten dollars from a grant received. Both male and female students participated in the study. 144 participants were run through the experiment; 56 participants from a previous study where demographic information was not collected and 87 participants were run this semester. Gender was broken down into 54 female and 34 male participants. The mean age of participants was 20 years of age.

### *Design*

The study is a 2 X 2 X 2 factorial design. The three independent variables are lineup presentation methods (simultaneous or sequential), presence of perpetrator in the lineup (target-absent or target-present), and lineup size (6 or 12 members). Primary dependent variables are witness choosing rates and decision accuracy.

### *Materials*

Each participant was given an informed consent form, which has been approved by the college's Institutional Research Review Board. The form indicated that the study concerned evaluation of video images, that the students were not required to participate, and that, if they did participate, they could withdraw from the study at any time without penalty.

The 30 second video clip was viewed on a laptop computer. The video on the laptop was approximately 2 inches by 2 inches. The scene depicted a male and female student in an underground parking lot. After separating, the female was approached by a young male, the perpetrator, who asked for the time, grabbed the woman's purse, and ran off. The perpetrator was visible for 10 seconds.

The lineup portion of the experiment had each participant view one of eight lineup conditions on paper. The lineups were randomly presented in eight forms: Sequential or simultaneous, target-present or target-absent, and 6 or 12 members. In addition the position of the lineup members was counterbalanced in positions 2 and 5 for both the perpetrator and the innocent filler in target-absent conditions.

In the simultaneous lineup presentations, participants viewed a paper sheet of all six/twelve photos. The six member lineups were presented on one sheet of paper, while the twelve member lineup was viewed on two sheets of paper to ensure photo size equality. For the sequential lineup presentations, the witnesses viewed the full lineup in a bound booklet of photos, advancing the page once they had viewed and made a decision about a lineup member. They were not allowed to go backwards or compare photos side by side. Response options for both formats are, "Yes, this is the perpetrator," "No, this is not the perpetrator," or "I'm not sure."

Participants were also asked to rate their confidence level for their choice of the perpetrator. Previous research has shown that confidence is not linked with correct identification (Wells & Olson, 2003), but the research included the confidence rating for supplemental data analysis and report.

### *Procedure*

After signing the consent forms, the participants were introduced to the laptop and appropriate instructions, following a written script. The administrator then departed to another part of the room in order to ensure privacy.

They completed simple demographic information, viewed the video, and proceeded into the lineup. Once they had gone through the lineup, the participant was instructed to alert the lab administrator that they had finished. The participant was thanked and debriefed.

## RESULTS

The research question this paper sought to answer was whether or not the size of a lineup, 6 versus 12 photos, had an effect in either simultaneous or sequential lineups.

The key witness response measures were *correct identifications* in the target-present lineups and *identification errors* in target-absent lineups.

Our first hypothesis was that the lineup with the most correct identifications would be the simultaneous 6-person lineup followed by the simultaneous 12, the sequential 6, and the sequential 12-person lineup, respectively. Our second hypothesis was that the simultaneous 12-person would yield the most identification errors, followed by the simultaneous 6, sequential 12, and sequential 6-person lineups, respectively. A z-test for proportions was used to assess the statistical significance of each comparison.

#### *Simultaneous Lineup*

The rate of correct identifications in a simultaneous target-present lineup differed significantly between the 6-person and 12-person,  $z = 1.63$ ;  $p = .05$ , with identification percentages of 66% and 40% respectively. The effect size is  $r = .25$ . The 6-person and 12-person simultaneous target-present lineups did not differ significantly in filler or no choice selection. (See Figure 1.)

In the target-absent condition, there was no significant difference in correct rejections or filler identification between the 6-person and 12-person simultaneous lineups ( $z = .20$ ;  $p = .42$ ). (See Figure 2.)

#### *Sequential Lineup*

The z-test for proportions revealed no significant difference in correct identifications between 6-person and 12-person sequential lineups ( $z = .79$ ;  $p = .21$ ;  $r = .15$ ), with identification percentages of 20% and 9%, respectively. There was also no significant difference in filler or no choice selections between 6-person and 12-person lineups. (See Figure 1.)

In the target-absent condition, there was no significant difference in correct rejections or filler identifications between the 6-person and 12-person lineups in the sequential lineups ( $z = .94$ ;  $p = .17$ ). (See Figure 2.)

#### *Choosing Rates*

In the target-present simultaneous lineup, the choosing rate for the 6-person lineups was 80%, while the choosing rate for the 12-person lineups was 47%. This result is statistically significant ( $z = 2.13$ ;  $p = .02$ ).

In the target-present sequential lineup, the choosing rate for the 6-person lineups was 27%, while the choosing rates for the 12-person lineups was 18%. The result was not statistically significant ( $z = .53$ ;  $p = .30$ ). (See Figure 3)

#### *Confidence Rates*

An independent t-test revealed no significant difference in reported confidence between 6-person ( $M = 4.11$ ) and 12-person ( $M = 4.00$ ) lineups,  $t(136) = .66$ ,  $p = .25$ . Within the simultaneous lineups, 6-person lineups elicited higher rates of reported confidence ( $M = 4.19$ ) than did the 12-person lineup ( $M = 4.07$ ),  $t(85) = .62$ ,  $p = .27$ . The reported confidence between sequential 6-person ( $M = 3.97$ ) and 12-person ( $M = 3.90$ ) was not statistically significant. (See Figure 4)

Not surprisingly, in the target-absent conditions, a trend towards lesser confidence than in target-present conditions was reported; target-present ( $M = 4.17$ ) and target-absent ( $M = 3.94$ ),  $t(139) = 1.32$ ,  $p = .09$ . (See Figure 5.)



## DISCUSSION

The goal of this study was to determine the effect of nominal lineup size on simultaneous and sequential lineup presentation. The current study examined both a simultaneous and sequential lineup presentation and, using both target-present and target-absent conditions, looked for a significant effect of nominal lineup size in a 6 member lineup and a 12 member lineup.

### *Target-Present*

The hypothesis was broken into the conditions of target-present and target-absent. As previously stated, in the target-present condition, the research was concerned with correct identifications of the suspect. Past research has indicated that simultaneous lineups promote higher choosing rates, and when the target is present, simultaneous lineups can bring forth higher levels of correct identifications. Therefore the 6 member simultaneous lineup should yield the most correct identifications. The 12 member simultaneous lineup should yield the second highest number of correct identifications, a slight reduction from the first. Our hypothesis was found to be correct. The simultaneous target-present 6-person lineup did yield the highest number of correct identifications. This was predicted in the hypothesis, since relative judgment favors a shorter lineup when the perpetrator is present.

Our ranking hypothesis also proved to be supported in regards to the simultaneous 12-person target-present lineup. It presented the second highest number of correct identifications. The greater number of individuals in the lineup may have distracted the participants from the perpetrator in the lineup. This idea of distraction would increase in accordance with the number of individuals in the lineup.

Previous research has demonstrated the lower choosing rates found in sequential lineup presentations, thus prompting the hypothesis ranking to place the sequential lineups after the simultaneous lineups. The data in the study supported the hypothesis and past research.

The reason for placing the 12-person sequential lineup after the 6-person was the hypothesis that eyewitnesses may switch from an early selection to a later selection. Thus, the number of correct identifications may lessen slightly in the sequential 12-person lineup. Additionally there may be some interference effect. The increasing number of photos the person views may alter his or her memory of the perpetrator, prompting a "no choice" or "not present" response, since the memory of the perpetrator has altered.

Our hypothesis hierarchy for the target-present condition was supported by the data collected. Simultaneous lineups will elicit more correct identifications than sequential lineups due to the drop in choosing rates. The smaller lineup sizes will provide less interference and distraction for the eyewitness. When the target is present in the lineup, a simultaneous 6-person lineup will yield the most correct identifications, while the sequential 12-person will yield the fewest correct identifications.

### *Target-absent*

As for the target-absent conditions, the concentration was placed on the number of errors made through false positives, or choosing an innocent lineup member. The hypothesis stated that the 12 member simultaneous lineup should yield the largest number of errors. The data supported the hypothesis. Relative judgment abounds in simultaneous lineups because the eyewitnesses are easily able to compare the faces

against one another. A 12 member lineup has that many more fillers to draw the eyewitness away from the memory of the perpetrator. Simple proportions demonstrate the risk of 1 in 12 in the larger lineup and 1 in 6 for the smaller lineup. Additionally, there could be some interference from the number of faces viewed. Thus, relative judgment and the interference effect combine to place the 12 member simultaneous lineup as generating the most errors in the target-absent condition.

The effects of relative judgment are so pervasive that the research predicted the 6-person simultaneous lineup to be next in the ranking for number of errors. It would be better than the 12-person lineup by probability, as previously demonstrated. However, relative judgment results in filler identification in target-absent conditions. The data collected supported our hypothesis.

The sequential lineups came next in line. Their naturally lower choosing rates make them a less risky choice for target-absent. The 12-member sequential was predicted to generate the third highest number of errors. The data supported this as well. With twelve individuals, participants may feel pressured to choose in the second half of the lineup. The number of photos in the lineup could seem daunting. Also, the research may reflect the interference effect in the multitude of photos presented.

The 6-person sequential lineup was predicted to yield the fewest errors; the data supported the hypothesis. Relative judgment has been replaced with absolute judgment in a sequential setting. The traditional number of 6 lineup members may alleviate pressure to choose. Also, the choosing rates are lower for sequential lineups. Thus, the 6-person sequential did, in fact, generate the fewest errors.

Our hypothesis hierarchy for the target-absent condition was also supported by the data collected. Simultaneous lineups will elicit more errors from eyewitness identification than sequential lineups. This is due to relative judgment. When eyewitnesses compare lineup members against one another to see who most matches their memory, it may be innocent filler. The smaller lineup sizes make for more distractions, comparisons, and interference. When the target is absent from the lineup, the simultaneous 12-person lineup will generate the most errors in identification, while the sequential 6-person lineup will generate the fewest errors.

#### *Observations*

The participant pool was regrettably smaller than desired. This could be due to the multitude of lineup research being conducted at similar times and the fact that participants can only run through the experiment once. Recruitment was a difficult task for this experiment.

The effect size of the groups was calculated and found to be a moderate effect size ( $r = .25$ ) and a small effect size ( $r = .15$ ). As discussed earlier, the sample size, if increased, could allow trends to become more pronounced and perhaps significant, increasing the effect size of the experiment. Thus, it is recommended that more participants be run through the experiment to discover more significant results.

#### *Conclusions*

The conclusions of the research leave a desire for additional research to determine if trends will continue in the direction they showed. However, the one significant finding supports the hypothesis in its prediction that 6-person lineups are superior to 12-person lineups. Additionally, the trends in the results match up with the

hypotheses made. A 6-person lineup appears to be superior to the 12-person lineup in yielding more correct identifications and fewer errors in identification.

This research is also in agreement with the current debate in lineup research regarding simultaneous and sequential lineup presentation. The 6-person simultaneous lineup yielded the highest number of correct identifications. However, the 6-person sequential lineup yielded the least number of errors.

It is the recommendation of this research paper that the lineup size continue to remain at the traditional 6-member lineup. And when examining simultaneous versus sequential, the research recommend that, rather than incarcerate an innocent individual through a mistaken identification in a simultaneous lineup, investigative forces can use other means of evidence to locate and prosecute suspects. Sequential lineups reduce the number of errors in identification. Eyewitnesses have been shown to be unreliable and the judicial system still succumbs to their influence. The recent exonerations provide more than enough examples for legislators and law enforcement to see the influence of mistaken eyewitness identification.

We recommend the use of 6-person lineups rather than 12-person lineups. The research also recommends the use of sequential lineups rather the simultaneous lineups. The data collected in the research supports our stance. The ethical questions become whether to err on the conservative side, using the sequential lineup, and possibly allow some perpetrators to continue to be free, or to allow law enforcement to use simultaneous lineups knowing that they could potentially incarcerate innocent individuals. Perhaps there is another way to view the problem. Rather than innocent individuals being incarcerated while the guilty roam free, perhaps the research can find other means to locate a suspect. Perhaps the lineup will let some guilty individuals go unidentified, but at least there is not an innocent person standing in the real perpetrator's place—behind bars.

Table 1

*Ranking of the Highest Number of Correct Identifications in Target-Present Lineups*

Ranking	Lineup Condition
First	Simultaneous 6 Person
Second	Simultaneous 12 Person
Third	Sequential 6 Person
Fourth	Sequential 12 Person

Table 2

*Ranking of Highest Number of Errors, or Incorrect Identifications in Target-Absent Lineups*

Ranking	Lineup Condition
First	Simultaneous 12 Person
Second	Simultaneous 6 Person
Third	Sequential 12 Person
Fourth	Sequential 6 Person

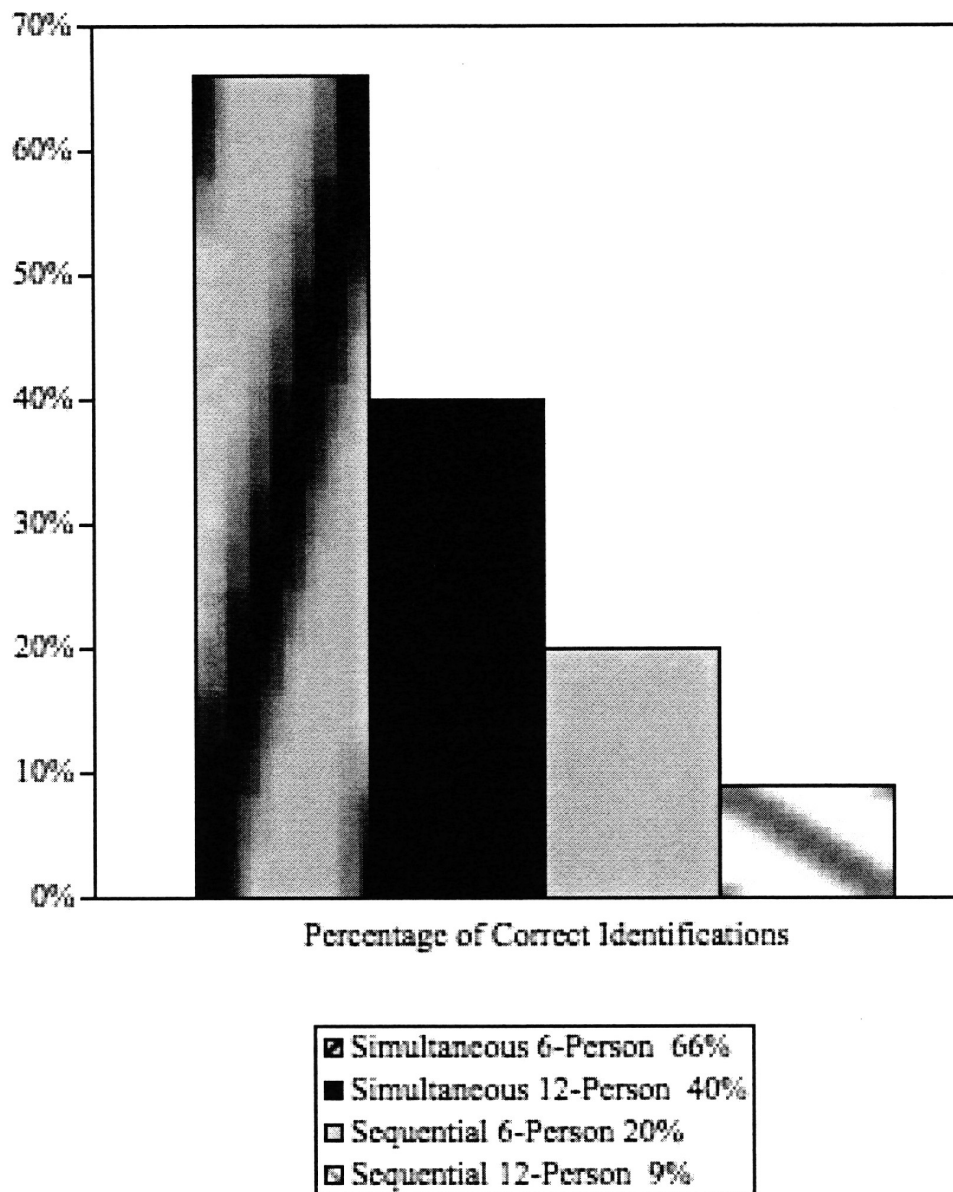


Figure 1. Target-Present Results – Eyewitness correct identification when target was present in the lineup presentation.

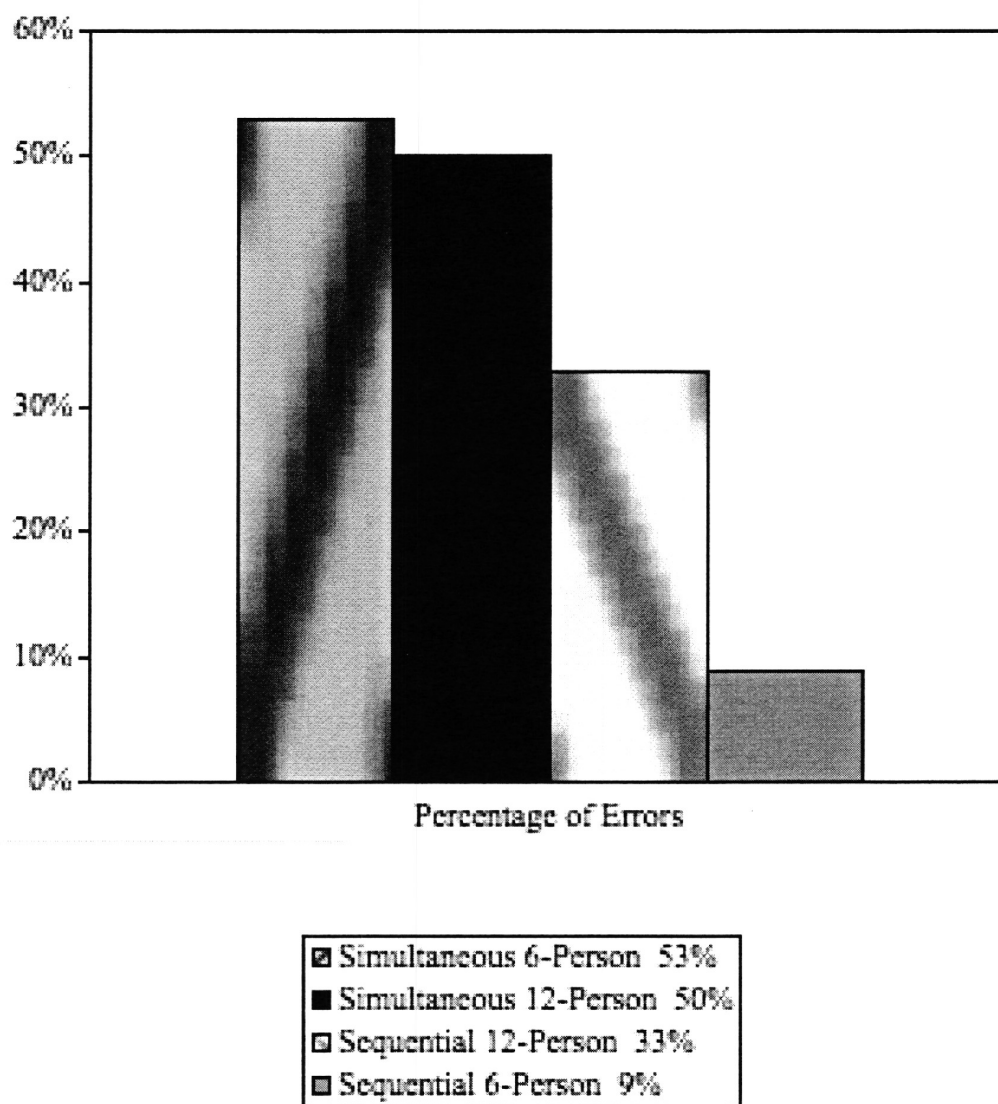


Figure 2. Target-Absent Results – Eyewitness false positives, incorrect identifications, when target was absent from the lineup presentation.

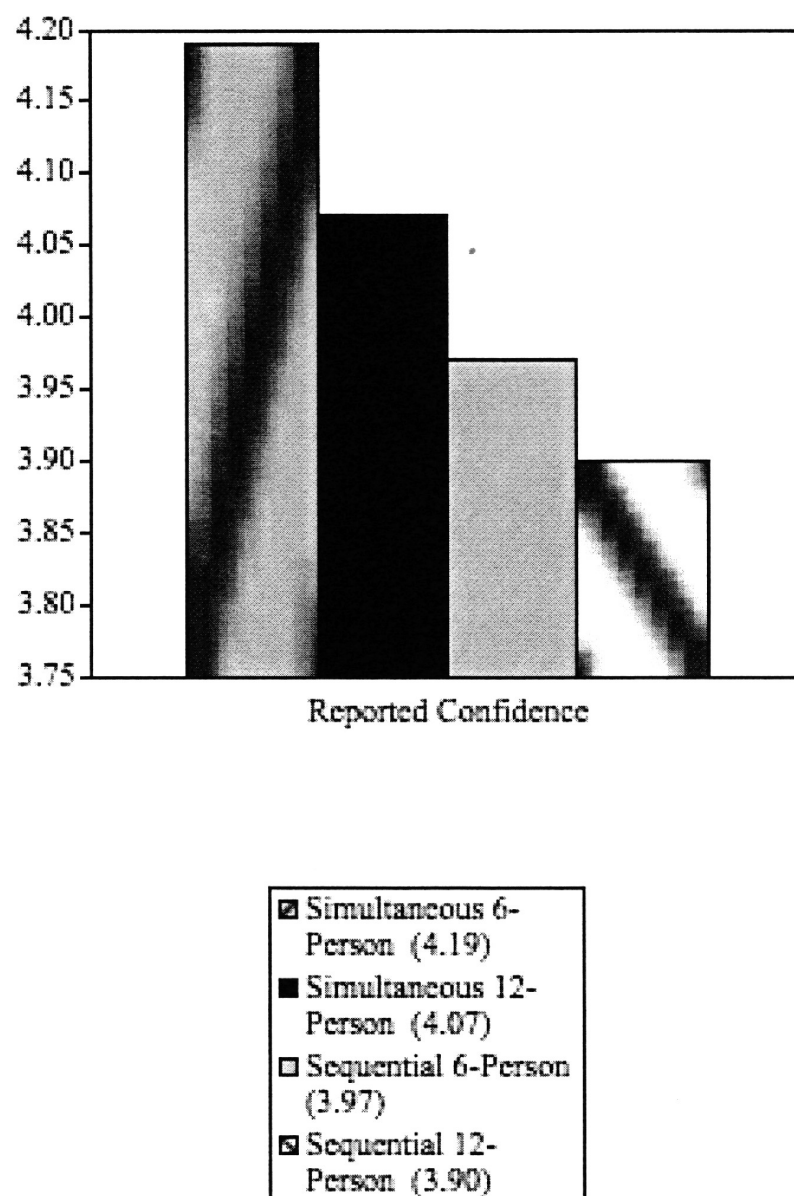
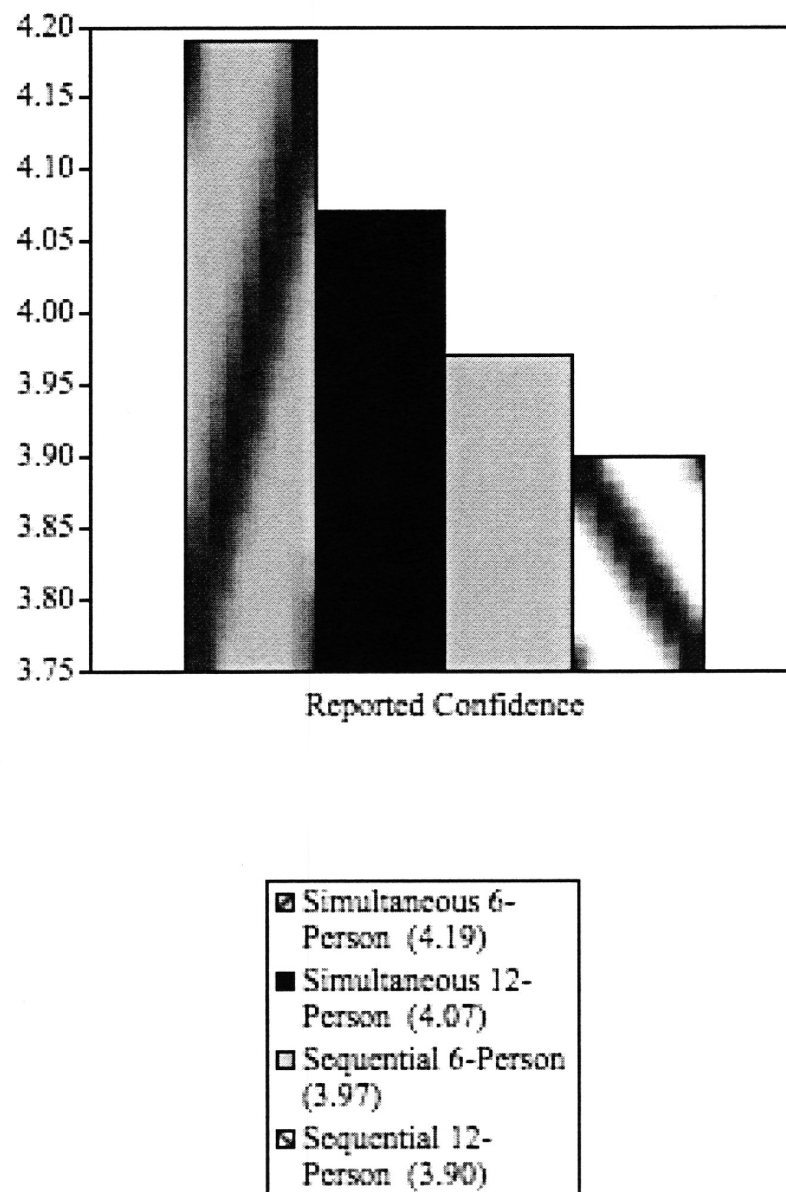
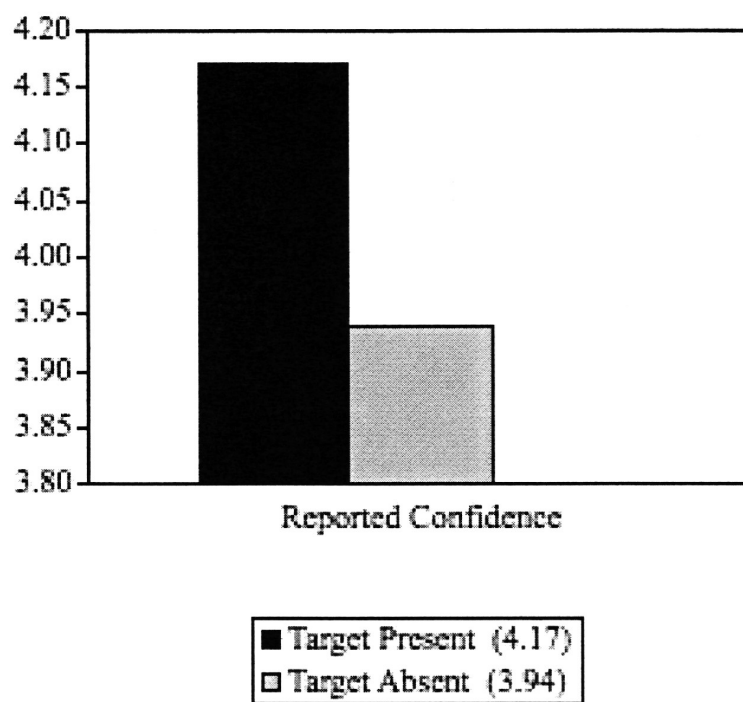


Figure 3. Choosing Rates - Eyewitness's rates of choosing a member of the lineup



*Figure 4.* Reported Confidences – Eyewitness's reported levels of confidence after choosing or not choosing a member of the lineup; a comparison of lineup presentation & size





*Figure 5.* Reported Confidences – Eyewitness's reported levels of confidence after choosing or not choosing a member of the lineup; a comparison of target present and target absent conditions

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